

Astronomy

ES-2 The student will demonstrate an understanding of the structure and properties of the universe.

ES-2.2 Identify properties and features of the Moon that make it unique among other moons in the solar system.

Taxonomy level: 1.1-B Remember Conceptual Knowledge

Previous/future knowledge: Students in 4th grade compared the motion and surface features of the Moon to the Sun and the Earth. They also developed an understanding of the Moon's position in relationship to Earth and the Sun. In 8th grade students summarized characteristics of the Moon, including phases, eclipses, and tides, along with other objects in the solar system. This is the first time that properties and features of the Moon, including its surface, have been studied in relation to other moons.

It is essential for students to know that the Moon as Earth's natural satellite is unique among the moons in the solar system.

Unique Properties:

<i>Size</i>	The Moon is one of the largest in the solar system, especially compared to the size of the planet it orbits. Also, the Moon is the only large moon among the inner planets. (Mercury and Venus have no moons, and the moons of Mars are just two chunks of rock).
<i>Orbit distance</i>	The Moon's orbit is relatively farther from Earth than most moons are from the planets they orbit.
<i>Composition</i>	The Moon is a solid, rocky body, in contrast to the icy composition of the moons of the outer planets.

Features:

<i>Craters</i>	All the craters on the Moon are impact craters.
<i>Rays</i>	Long trails of material (ejecta) blasted out from impacts on the Moon radiate out from craters.
<i>Maria</i>	These are dark, smooth plains of lower elevation on the Moon; they may contain craters and small meandering, valley-like structures.
<i>Highlands</i>	Cover most of the lunar surface, are mountainous, and are heavily covered with craters.
<i>Atmosphere</i>	The Moon has no atmosphere.

Other features of the moon due to its movement and relation to Earth are its phases and its gravitational effect causing tidal pull on Earth.

- Because of its size and the fact that the same side of the Moon always faces Earth, the illuminated side of the Moon that can be seen from Earth goes through sequential changes called phases. Students can revisit this concept as they study the unique properties and features of Earth's Moon.
- Because of its size and its close proximity to Earth, the Moon's pull of gravity creates bulges of ocean water on both the near and far sides of Earth. As Earth rotates, these bulges remain aligned with the Moon so that the ocean level rises and falls about every 12 hours. The Sun's gravitational pull also has an effect on the formation of tides, but it is about half that of the Moon.

It is not essential for students to know all the moons of the solar system or exactly how many moons each planet has.

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Assessment Guidelines:

The objective of this indicator is to *identify* properties and features of the Moon; therefore, the primary focus of assessment should be to have students retrieve from memory information related to the Moon's properties and features.

In addition to *identify* appropriate assessments may require students to:

- *identify* a particular feature from its description; or
- *recall* how the Moon is unique from other moons based on a particular property.